Computer Graphics Metafile Transfer Using:
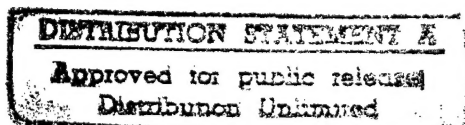
Texas Instruments Data

MIL-D-28003 (CGM)

Quick Short Test Report

27 October 1992

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Prepared for

Electronic Systems Center

DTIC QUALITY INSPECTED 3

Computer Graphics Metafile Transfer

Using:

Texas Instruments Data

MIL-D-28003A (CGM)

Quick Short Test Report

27 October 1992

Prepared By
Air Force CALS Test Bed
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DISCLAIMER

Contents

1. Introduction

1.1 Background

The Department of Defense (DoD) Computer-aided Acquisition and Logistics Support (CALS) Test Network (CTN) is conducting tests of the military standard for the Automated Interchange of Technical Information, MIL-STD-1840A, and its companion suite of military specifications. The CTN is a DoD sponsored confederation of voluntary participants from industry and government, managed by the Electronic Systems Center (ESC).

The primary objective of the CTN is to evaluate the effectiveness of the CALS standards for technical data interchange and to demonstrate the technical capabilities and operational suitability of those standards. Two general categories of tests are performed to evaluate the standards; formal and informal.

Formal tests are large and comprehensive tests, which follow a written test plan, require specific authorization from the DoD, and may take months to prepare, execute, and report.

Informal tests are quick and shorts, used by the CTN technical staff, to broaden the testing base. They include representative samples of the many systems and applications used by CTN participants. They also allow the CTN staff to gain feedback from many industry and government interpretations of the standards, increase the base of participation in the CALS initiative, and respond to the many requests for help that come from participants. Participants take part voluntarily, benefit by receiving an evaluation of their latest implementation (interpretation) of the standards, interact with the CTN technical staff, gain experience using the standards, and develope increased confidence in them. The results of informal tests are reported in Quick Short Test Reports (QSTRs) that briefly summarize the standard(s) tested, the hardware and software used, the nature of the test, and the results.

1.2 Purpose

The purpose of the informal test, reported in this QSTR, was to analyze Texas Instruments' interpretation and use of the CALS standards in transferring Computer Graphics Metafile data. Texas Instruments used its CALS Technical Data Interchange System to produce data, in accordance with the standards, and delivered it to the CTN technical staff on a 9-track magnetic tape.

2. Test Parameters

Test Plan: AFCTB 92-072

**Date of
Evaluation:**   27 October 1992

Evaluator: George Elwood
                                   Air Force CALS Test Bed
                                   HQ ESC/ENCS
                                   4027 Colonel Glenn Hwy
                                   Suite 200
                                   Dayton, Ohio 45431-1601

**Data
Originator:**   Sheridan Hales
                                   Texas Instruments
                                   M/S 8420
                                   6500 Chase Oaks Boulevard
                                   P.O. Box 869305
                                   Plano, TX 75086

**Data
Description:**   Technical Manual Test
                                           1 Document Declaration file
                                           1 Computer Graphics Metafile (CGM) file

**Data
Source System:**

                         CGM
                                   HARDWARE
                                           NCD X-Terminal
                                           Sun 4/60
                                           Cipher M995 GCR 9-Track Tape Drive
                                   SOFTWARE
                                           Art&Letters UNIX V1.2

Evaluation Tools Used:

                    MIL-STD-1840A (TAPE)
                                   SUN 3/280

                                           CTN *Tapetool (v1.2.8) UNIX*
                                           AGFA Compugraphics *CAPS/CALS v40.4*

MIL-D-28003 (CGM)
SUN SparcStation 2
ArborText *cgm2draw*
Island Graphics *IslandDraw 3.0*
Sun 3/60
Advanced Technology Center
(ATC) *CGM-View R2.0*
Cheetah Gold 486
ATC *MetaVIEW R 1.12*
ATC *MetaCHECK R 2.05*
Software Publishing Corporation
(SPC) *Harvard Graphics 3.0*
Xerox *Ventura Publisher*

**Standards
Tested:**

MIL-STD-1840A
MIL-D-28003

3. 1840A Analysis

3.1 External Packaging

The tape arrived at the Air Force CALS Test Bed (AFCTB) en-
closed in a box In accrdance with ASTM D 3951.   The exte-
rior of the box was marked with the magnetic tape warning
label, as required by MIL-STD-1840A, para. 5.3.1.3.

The tape was enclosed in a barrier bag as required by
MIL-STD-1840A, para. 5.3.1.2.   Inspection of the tape reel
showed the label indicating the recording density as re-
quired by MIL-STD-1840A, para. 5.3.1.   Enclosed in the box
was a packing list showing all files that were recorded on
the tape.

3.2 Transmission Envelope

The 9-track tape received by the AFCTB contained MIL-
STD-1840A files.   The files were named per the standard
conventions.

3.2.1 Tape Formats

The 1840A tape was run through the CTN *Tapetool v1.2.8*
utility.   No errors were encountered while evaluating the
contents of the tape labels.

3.2.2 Declaration and Header Fields

No errors were found in the Document Declaration file or
Data File Header.

4. IGES Analysis

No Initial Graphics Exchange Specification (IGES) files were
included on this tape.

5. SGML Analysis

No Standard Generalized Markup Language (SGML) files were included on this tape.

6. Raster Analysis

No Raster files were included on this tape.

7. CGM Analysis

One CGM file was included on this tape. The file was evaluated using ATC's *MetaCHECK* software with CALS options. This utility reported that the file does not meet the CALS MIL-D-28003 specification, because it lacks the CALS statement. The CTN *validcgm* reported the same error. An example of the error message is shown below:

Error 6501: Element Class/ID: 1/2   Offset: 42 octets Element No. 3
The METAFILE DESCRIPTION string is invalid; it lacks the phrase
"MIL-D-28003/BASIC-1" required by the Profile.

The file also exhibited a basic CGM error but the file was reported as meeting basic CGM requirements. An example of the error message is shown below:

Bulletin 20027: Element Class/ID: 4/7   Offset: 366 octets Element No. 21
Warning; a foreground color has been defined and referenced by a primitive,
while the background color has not been defined.

The file was imported into various CGM capable utilities available in the AFCTB with differing results. The file was converted using ArborText's *cgm2draw* utility. The resulting file was then read into Island Graphics' *IslandDraw*. The resulting text was backward. The graphic image appeared to be correct.

The file was displayed and printed using ATC's *CGM-View*. No errors were reported but the file had text that was backward. It appeared that the entire image was reversed.

The file was imported into SPC's *Harvard Graphics v3.0*. One error was reported on clipping. The resulting image had text that was backward on the screen and hard copy. The entire image was reversed.

The file was imported directly into Island Graphics' *Island-Draw*. The image was correct, and the text appeared correctly on the screen and hard copy.

The file was read into ATC's *MetaVIEW* and displayed. The image appeared to be upside down. No text displayed because of the black background. No errors were reported during this procedure.

The file was imported directly into the Xerox *Ventura Publisher*. The display and hard copy appeared to be correct.

The CGM file does not meet the CALS MIL-D-28003 specification, because of the missing CALS statement.

8. Conclusions and Recommendations

In summary, the MIL-STD-1840A tape from Texas Instruments
was correct. The tape could be read properly using the CTN
Tapetool and AGFA *CAPS* without reported error.

The included CGM file does not meet the CALS MIL-D-28003
specification, because it lacks the required CALS phrase.
The file was imported into various CGM tools available in
the AFCTB with varying degrees of success. The most notable
error was the reversing of the text.

The tape does not meet the CALS MIL-STD-1840A requirements,
due to an error in the CGM file.

9. Appendix A - Tapetool Report Logs

9.1 Tape Catalog

CALS Test Network Catalog Evaluation - Version 1.2; Release Number 8

  Standards referenced:
    MIL-STD-1840A (1987) - Automated Interchange of Technical Information
    MIL-R-28003 (1988) - Digital Representation For Communication Of
                             Illustration Data; CGM Application Profile
    ANSI X3.27 (1987) - File Structure and Labeling of Magnetic Tapes
                         for Information Interchange
    ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

Mon Oct 26 16:28:20 1992

MIL-STD-1840A File Catalog

File Set Directory: /cals/tapetool8/Set106

Page: 1

File Name	File Type	Record Format/ Length	Block Length/Total	Selected/ Extracted
D001	Document Declaration	D/00260	02048/000001	Extracted
D001C001	CGM	F/00080	00800/000045	Extracted

Catalog Process terminated normally.

9.2 Tape Evaluation Log

CALS Test Network Tape Evaluation - Version 1.2; Release Number 8
  Standards referenced:
    ANSI X3.27 (1987) - File Structure and Labeling of Magnetic Tapes
                        for Information Interchange
    ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

Mon Oct 26 16:28:17 1992

ANSI Tape Import Log

Allocating tape drive /dev/rmt0...

/dev/rmt0 allocated.

VOL1CALS01   TI-TAPETOOL   4

  Label Identifier: VOL1
  Volume Identifier: CALS01 ·
  Volume Accessibility:
  Owner Identifier:
  Label Standard Version: 4

HDR1D001   CALS0100010001000000 92283 00000 000000TI-TAPETOOL

  Label Identifier: HDR1
  File Identifier: D001
  File Set Identifier: CALS01
  File Section Number: 0001
  File Sequence Number: 0001
  Generation Number: 0000
  Generation Version Number: 00
  Creation Date: 92283
  Expiration Date: 00000
  File Accessibility:
  Block Count: 000000
  Implementation Identifier: TI-TAPETOOL

HDR2D0204800260   00

  Label Identifier: HDR2
  Recording Format: D
  Block Length: 02048
  Record Length: 00260
  Offset Length: 00

*********** Tape Mark **************

  Actual Block Size Found = 2048 Bytes.

  Number of data blocks read = 1.

*********** Tape Mark **************

EOF1D001   CALS0100010001000000 92283 00000 000001TI-TAPETOOL

  Label Identifier: EOF1
  File Identifier: D001
  File Set Identifier: CALS01
  File Section Number: 0001
  File Sequence Number: 0001
  Generation Number: 0000
  Generation Version Number: 00
  Creation Date: 92283
  Expiration Date: 00000
  File Accessibility:
  Block Count: 000001
  Implementation Identifier: TI-TAPETOOL

EOF2D0204800260   00

  Label Identifier: EOF2
  Recording Format: D
  Block Length: 02048
  Record Length: 00260
  Offset Length: 00

*********** Tape Mark **************

HDR1D001C001   CALS0100010002000000 92283 00000 000000TI-TAPETOOL

  Label Identifier: HDR1
  File Identifier: D001C001
  File Set Identifier: CALS01
  File Section Number: 0001
  File Sequence Number: 0002
  Generation Number: 0000
  Generation Version Number: 00
  Creation Date: 92283
  Expiration Date: 00000
  File Accessibility:
  Block Count: 000000
  Implementation Identifier: TI-TAPETOOL

HDR2F0080000080   00

   Label Identifier: HDR2
   Recording Format: F
   Block Length: 00800
   Record Length: 00080
   Offset Length: 00

************ Tape Mark ***************

   Actual Block Size Found = 800 Bytes.

   Number of data blocks read = 45.

************ Tape Mark ***************

EOF1D001C001   CALS0100010002000000 92283 00000 000045TI-TAPETOOL

   Label Identifier: EOF1
   File Identifier: D001C001
   File Set Identifier: CALS01
   File Section Number: 0001
   File Sequence Number: 0002
   Generation Number: 0000
   Generation Version Number: 00
   Creation Date: 92283
   Expiration Date: 00000
   File Accessibility:
   Block Count: 000045
   Implementation Identifier: TI-TAPETOOL

EOF2F0080000080   00

   Label Identifier: EOF2
   Recording Format: F
   Block Length: 00800
   Record Length: 00080
   Offset Length: 00

************ Tape Mark ***************

************ Tape Mark ***************

############ End of Volume CALS01 #############

############ End Of Tape File Set #############

Deallocating /dev/rmt0...

Tape Import Process terminated with 0 error(s), 0 warning(s),
and 0 note(s).

9.3 Tape File Set Validation Log

CALS Test Network File Set Evaluation - Version 1.2; Release Number 8
  Standards referenced:
    MIL-STD-1840A (1987) - Automated Interchange of Technical Information

Mon Oct 26 16:28:20 1992

MIL-STD-1840A File Set Evaluation Log

File Set: Set106

Found file: D001
Extracting Document Declaration Header Records...
Evaluating Document Declaration Header Records...

srcsys: Texas Instruments P.O.Box 869305 Plano, TX 75086
srcdocid: CALS Test Network Test Document 1
srcrelid: NONE
chglvl: ORIGINAL
dteisu: 19921009
dstsys: CALS TEST NETWORK AFLC LMSC/SJT WRIGHT-PATTERSON AFB, OHIO 44533-5001
dstdocid: TEXAS INSTRUMENTS TEST DOCUMENT 1
dstrelid: NONE
dtetrn: 19921009
dlvacc: NONE
filcnt: C1
ttlcls: UNCLASSIFIED
doccls: UNCLASSIFIED
doctyp: Product Data
docttl: NONE

Found file: D001C001
Extracting CGM Header Records...
Evaluating CGM Header Records...

srcdocid: NONE
dstdocid: NONE
txtfilid: NONE
figid: NONE
srcgph: NONE

doccls: UNCLASSIFIED
notes: NONE

Saving CGM Header File: D001C001_HDR
Saving CGM Data File: D001C001_CGM

Evaluating numbering scheme...
No errors were encountered during numbering scheme evaluation.
Numbering scheme evaluation complete.

Checking file count...
No errors were encountered during file count verification.
File Count verification complete.

No errors were encountered in Document D001.

No errors were encountered in this File Set.

MIL-STD-1840A File Set Evaluation Complete.

9.4 Other Tape Reading Logs

No errors were reported by the AGFA *CAPS read1840A* utility.

10. Appendix B - CGM Detail Analysis

10.1   File D001C001

10.1.1   Parser Log MetaCHECK

```
MetaCHECK Version 2.05 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-91 CGM Technology Software
Execution Date: 10/27/92     Time:  07:54:39

Metafile Examined    : \9272\d001c001.

Pictures Examined    : All
Elements Examined    : All
Bytes     Examined    : All


====================== Trace Report =======================

Tracing not selected.

============== CGM Conformance Violation Report ==============

Bulletin 20027: Element Class/ID: 4/7   Offset: 366 octets Element No. 21
Warning; a foreground color has been defined and referenced by a primitive,
while the background color has not been defined.

========== CALS CGM Profile (MIL-D-28003) Report ============

Error 6501: Element Class/ID: 1/2   Offset: 42 octets Element No. 3
The METAFILE DESCRIPTION string is invalid; it lacks the phrase
"MIL-D-28003/BASIC-1" required by the Profile.

================ Conformance Summary Report =================

MetaCHECK Version 2.05 -- CGM/MIL-D-28003 Conformance Analyzer
Copyright 1988-91 CGM Technology Software
Execution Date: 10/27/92     Time:  07:54:47

Name of CGM under test: \9272\d001c001.
Encoding             : Binary

Pictures Examined    : All
Elements Examined    : All
Bytes     Examined    : All
```

BEGIN METAFILE string : "CGM v1.2 A&L for direct color.   "
METAFILE DESCRIPTION : "Arts & Letters Composer - (c) 1991 Computer
                        Support Corp. - CGM v1.2   "

Picture 1 starts at octet offset 270; string contains: "Start"

Conformance Summary : This file conforms to the CGM specification.

                        However, this file does not satisfy
                        the CALS CGM Profile (MIL-D-28003).

Summary of Testing Performed and Errors Found:

        1 Pictures Tested
     2951 Elements Tested
    34906 Octets Tested

    0 Illegal CGM Elements   1000 -   1999
    0 Incorrect CGM Element Lengths   2000 -   2999
    0 CGM State Errors   3000 -   3499
    0 Required CGM Elements Missing or Wrong   4000 -   4499
    0 CGM Parameter Values Out of Range   6000 -   6499
    0 CGM Structure Errors   7000 -   7499
    0   ***   CGM Errors Found (total)   ***

    0 Profile State Errors   3500 -   3999
    0 Illegal Profile Elements   4500 -   4999
    1 Profile Parameter Values Out of Range   6500 -   6999
    0 Profile Data Limits Exceeded   8500 -   8999
    0 Other Profile Constraints Violated   9500 -   9999
    1   *** Profile Violations Found (total) ***

    1 Warnings (Advisory Remarks)   20000 - 20999

    2 distinct errors and warnings were reported.

================ End of Conformance Report ==================

10.1.2 validcgm Log

```
Analysis for file c001.cgm using table table
MILSPEC 28003 error: descriptor doesn't contain MIL-D-28003/BASIC-1
(3, 42)          (1, 2, 72)      Metafile Description "Arts & Letters Composer - (c) 19
Computer Support Corp. - CGM v1.2     "
(0, 1) occurred 1 time
(0, 2) occurred 1 time
(0, 3) occurred 1 time
(0, 4) occurred 1 time
(0, 5) occurred 1 time
(1, 1) occurred 1 time
(1, 2) occurred 1 time
(1, 3) occurred 1 time
(1, 7) occurred 1 time
(1, 8) occurred 1 time
(1, 10) occurred 1 time
(1, 11) occurred 1 time
(2, 1) occurred 1 time
(2, 2) occurred 1 time
(2, 3) occurred 1 time
(2, 6) occurred 1 time
(2, 7) never occurred, required by standard B
(3, 5) occurred 1 time
(4, 1) occurred 2226 times
(4, 7) occurred 92 times
(5, 3) occurred 61 times
(5, 4) occurred 154 times
(5, 22) occurred 154 times
(5, 23) occurred 154 times
(5, 30) occurred 92 times
(5, 35) occurred 1 time
```
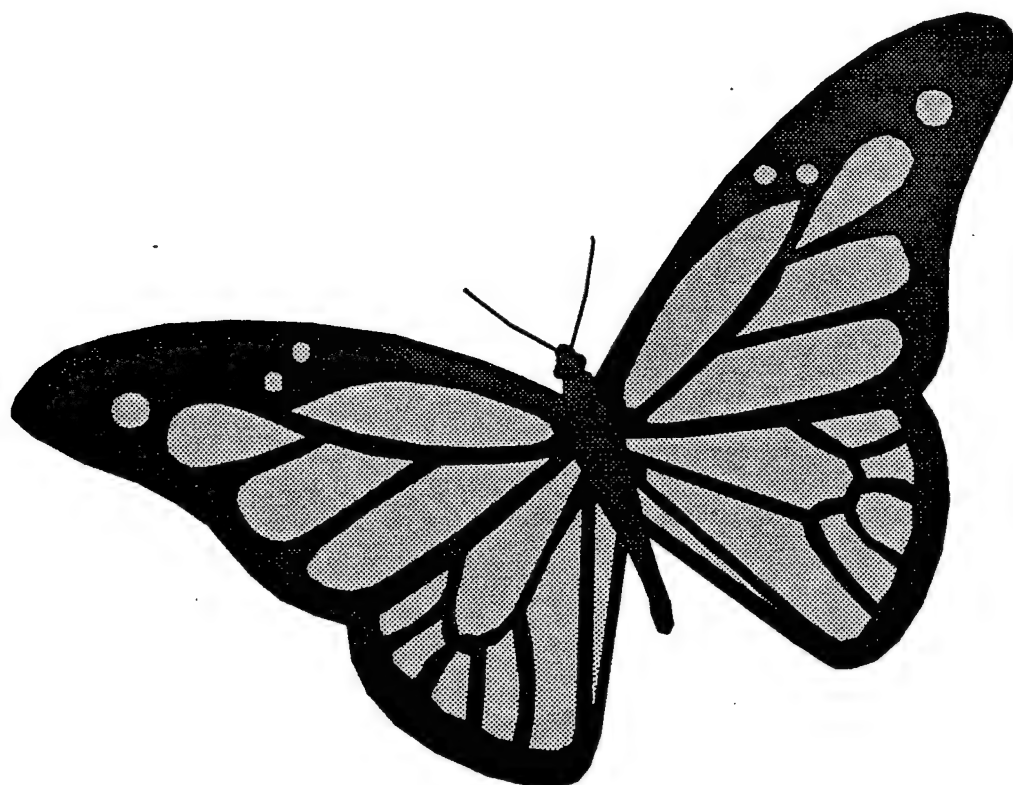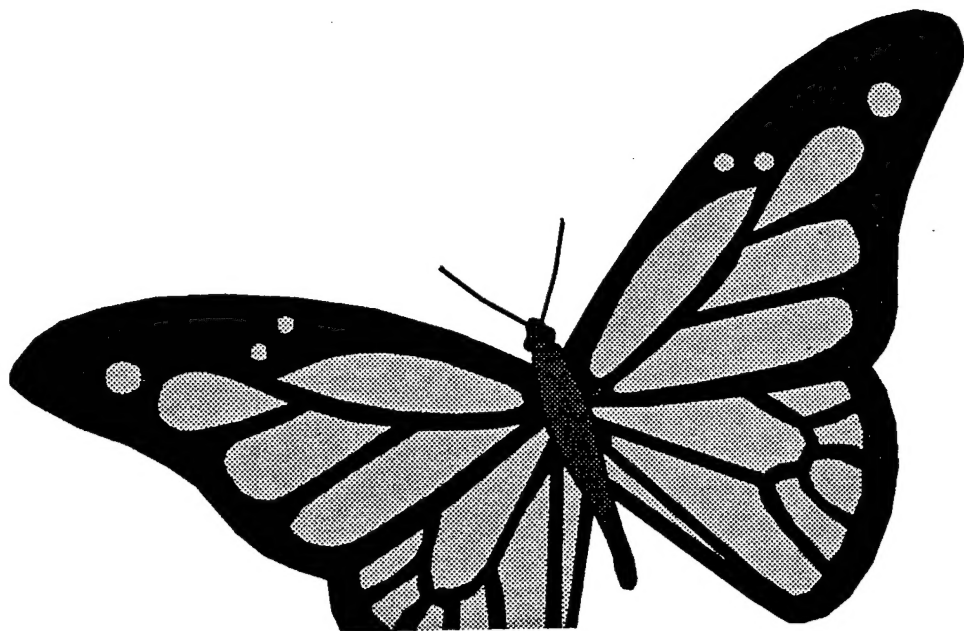
10.1.3 Output cgm2draw/IslandDraw

10.1.4 Output CGM-View

**Arts & Letters Graphics Composer
for Sun Workstations. Version 1.2**

10.1.5 Output Harvard Graphics

for Sun Workstations Version 1.5
Arts & Letters Graphics Composer

10.1.6 Output IslandDraw

Arts & Letters Graphics Composer for Sun Workstations. Version 1.2

10.1.7 Output Ventura Publisher

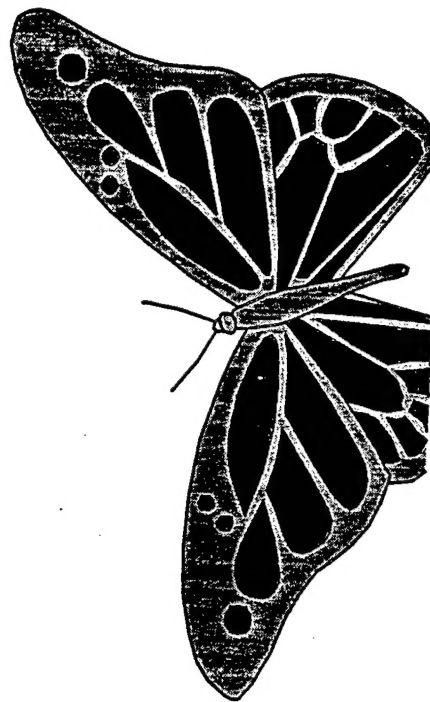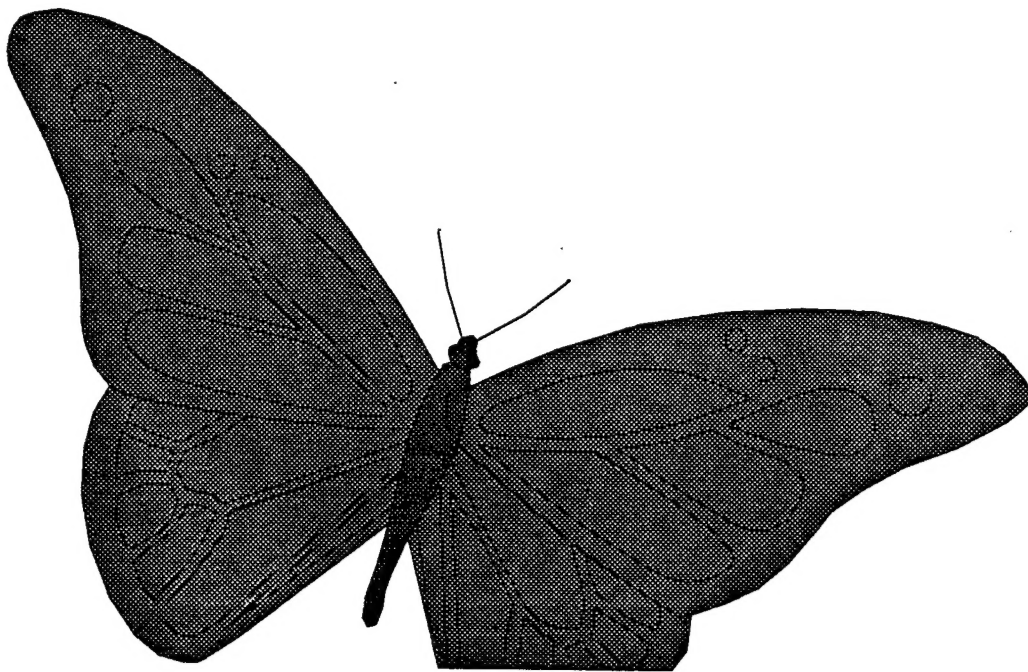# Arts & Letters Graphics Composer for Sun Workstations. Version 1.2